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Maine Department of Transportation

Transportation Research Division

MDOT – Bangor Liquid Storage Facility

Problem Solving 06-6

Documentation of Liquid De-icing Agents Utilized During the Winter of 2005-2006

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Introduction

During the winter of 2005-2006, the Maine Department of Transportation (MaineDOT), Bureau of Maintenance and Operations experimented with several liquid de-icing products designed to pre-wet granular materials. This experimentation was undertaken in an effort to determine which liquid de-icer would be the most suitable replacement for the calcium chloride (LiquiDow) product previously used by the Department. LiquiDow is no longer available from the supplier who was providing the product. It is unclear at this time if LiquiDow can be obtained from one of the other suppliers in the industry.

A process was subsequently developed to document the results experienced by the Departments Highway Maintenance crews. Several Crew Supervisors from each Region, representing a cross-section of opinions, were interviewed as part of this process. A list of 10 questions (attached) was used to initiate an informal discussion with each group. Results of these discussions, summarized by Region, are included in Appendix A.

Summary

MeltDown 30

Opinions on Product performance were similar from Region to Region with one exception. MeltDown 30 was primarily used in Regions 1 and 2. Region 1 was quite satisfied with their achieved results, while Region 2 was not at all satisfied. Region 4 staff had very little comment pertaining to their experience with MeltDown 30.

Region 1 staff reported that MeltDown 30 appeared to last longer and stay on the road longer than LiquiDow. They also indicated that MeltDown 30 worked well at lower temperatures, didn't cause the road to become "slimy" and didn't refreeze like occasionally happened with the use of LiquiDow. Application rates reported were slightly higher than those used with LiquiDow.

Region 2 reported having numerous issues with "icing" shortly after the MeltDown 30 was applied. Several Crew Supervisors actually stopped using the product because of poor results.

Both Regions reported having instances of screens clogging at the pump located on the trucks. Region 1 is recommending that these screens be removed and cleaned after each storm.

GeoMelt

GeoMelt is strictly a mixing product and has no chlorides added previous to shipping. Those in Regions 2 and 4 that mixed the Geomelt product with their existing salt brine were pleased with the results and believed that the addition of the product actually decreased the "working" temperature of the salt brine by as much as 15 degrees. The mix ratio used in Region 2 was 70 percent salt brine/30 percent Geomelt, while Region 4 used a 75 percent salt brine/25 percent Geomelt combination. Staff from both Regions indicated that the granular material seemed to "stick to the road" better when treated with the salt brine/Geomelt mixture. Only minimal clogging at the truck pump screen was reported. Application rates were typically in the 8 to 10 gallons per ton range.

M1000

Crew Supervisors in the Region 2 Maintenance facilities located in Edgecomb and Washington were very happy with the M1000 product. They compared it favorably to LiquiDow and indicated that M1000 worked well at low temperatures. Application rates were similar to those of LiquiDow and no clogging issues were reported.

GeoMelt C

Geomelt C was used in Region 4 at two locations; Pembroke and Plymouth. Staff indicated that Geomelt C worked similar to the LiquiDow product and granular material seemed to "stick to the road" better when treated with Geomelt C. Crew Supervisors reported an appearance similar to sand on the roadway after the application of granular salt that had been pre-wetted with Geomelt C. No clogging issues were reported.

Ice-B-Gone

Ice-B-Gone was used throughout Region 5 and on a very limited basis in Region 3. Region 5 staff indicated that Ice-B-Gone worked similar to LiquiDow, without some of the negative characteristics. Roadways dried faster after the storm and no "slimy" film was created. Materials treated with Ice-B-Gone seemed to "stick to the road" better and kept the snow "mealy and workable". Ice-B-Gone did not work quite as well as LiquiDow at low temperatures.

To minimize clogging in the storage tanks, Region 5 is recommending that stored product be "circulated" monthly. Filtering screens on the truck pumps have been removed to eliminate clogging with no negative effects.

IceBan

Region 5 also used IceBan on a limited basis. Indications were that IceBan worked fairly well at moderate temperatures, but its effectiveness was diminished considerably as temperatures decreased. In those colder temperatures, snow would melt and then refreeze, creating ice on the roadway and equipment. It was also noted that the road would stay wet several days after the storm.

The supplier of the IceBan product believes that an improper mixture of the product was delivered to the Ashland Maintenance facility. He has agreed to supply additional IceBan at no cost to Region 5 next winter to accommodate a re-evaluation of his product.

Table I summarizes the liquid use by Region.

Table I - Liquid Usage Summary

Product	Region 1	Region 2	Region 3	Region 4	Region 5
GeoMelt		X		X	
GeoMelt C				X	
IceBan					X
Ice-B-Gone			X		X
MeltDown 30	X	X		X	
M1000		X			
Salt Brine	X	X	X	X	X

Cost Summary

Costs per gallon of product varied significantly. The least expensive product continues to be salt brine. The estimated per gallon cost of this product is $0.15. Although GeoMelt is the most expensive product, mixing it with our existing salt brine in the recommended portion actually results in the GeoMelt/salt brine product being the second least expensive liquid evaluated.

Costs represented are those incurred for purchasing the product for this evaluation. Larger volume purchases may impact the final cost of product.

Table II summarizes the costs of each product used in this evaluation.

Table II

Product	Price/Gallon
Salt Brine	$0.15
*GeoMelt/Salt Brine	$0.79
MeltDown 30	$0.83
M1000	$0.92
IceBan	$1.15
Ice-B-Gone	$1.20
GeoMelt C	$1.36
GeoMelt	$2.28

* Represents a 70% Salt Brine / 30% GeoMelt Mix Ratio used in Region 2. GeoMelt/Salt Brine mixture was also tested in Region 4 using a 75% salt brine / 25 % GeoMelt combination. The cost of this mix is $0.68/Gallon

To further evaluate liquid product cost and better represent actual costs for granular applications with pre-wetting, tables were developed for each liquid product. Categories include the application rates typically used by the Department when pre-wetting is employed. Also included was the 70 percent granular/30

percent liquid method utilized by the Schmidt-STRATOS spreader. The STRATOS was evaluated during the winter of 2004-2005 and a written report was published in July, 2005 titled Evaluation of the Schmidt-STRATOS Spreader. The Department currently has four of these units in its fleet.

A summary of the tables, as well as the tables in their entirety are included in Appendix B.

In addition, a Cost Estimator was developed to calculate the cost of granular/liquid applications using the cost per ton of granular material and the cost per gallon of liquid materials. A copy of this Estimator is available on request.

Conclusions/Recommendations

Only MeltDown 30 received both positive (Region 1) and negative (Region 2) reviews. Region 1 reported no incidents of refreezing, while Region 2 Supervisors had concerns that MeltDown 30 actually created ice. It is unclear what caused these differing results. Possibilities include storm severity, temperature differences and variability in treatment methodology.

A response common to the majority of interviews was that the liquids that are brown in color seem to "stick to the road better". With nothing more than anecdotal evidence, it is unclear if the brown colored liquid products actually out-perform clear, non-colored liquids, or if this sticking is simply perceived.

In Regions 4 and 5 it was noted that the brown coloring actually gives travelers the impression that sand is being applied to the roadway. The Region 5 Manager conveyed the story of receiving several calls from travelers actually thanking him for returning to the use of sand.

Clogging at the screens of storage pumps and truck pumps was reported to be minimal. Region 1 recommends cleaning the screens of truck pumps after each storm, while Region #5 has actually removed the screens with no detrimental effects. Region 5 is also recommending stored product be "circulated" monthly.

No anti-icing efforts were undertaken using any of the products tested. Several Crew Supervisors indicated an interest in anti-icing, but voiced concern that the cost of liquids other than salt brine may make the practice prohibitive.

As noted in the Cost Analysis portion of this report, salt brine is less costly than any of the products tested. For this reason, it is critical to utilize salt brine for both anti-icing and pre-wetting whenever temperatures will allow. These "allowable" temperatures seem to vary widely by Region. Region 4 reports using salt brine for pre-wetting down to temperatures as low as 15 degrees Fahrenheit, while Region 5 does not recommend the use of salt brine at temperatures less than 25 degrees Fahrenheit.

It is recommended that an effort be undertaken on a statewide basis to assist each Region in determining what the minimum temperature is for effectively using salt brine within their Region.

GeoMelt, when mixed with salt brine was reported to have decreased the working temperature of salt brine by as much as 10 to 15 degrees. Perhaps by utilizing this product, Regions can become more confident in using salt brine at lower temperatures.

Virtually all of those interviewed believe the ability to apply more liquid material than is currently available would enhance the effectiveness of the liquids tested. The Department is currently pursuing ways in which to modify our existing fleet to accommodate greater liquid applications for pre-wetting granular material.

Temperature, weather severity and geographic considerations all play a part in what makes a product effective in some areas and less effective in others. What works well in Region 1, may not work well in the colder, more severe conditions encountered in Region 5. Considering these differences, it may be necessary to provide different products to several different Regions.

It is recommended that a more detailed review be undertaken, including the possibility of laboratory evaluations, to determine which liquid works best for each respective Region.

The Department should also undertake an extensive review of the environmental impacts of each liquid product being considered for use.

It is also recognized that each Region needs to have a product available, perhaps in small quantities, which will work well even in the most severe conditions.

With the increasing cost of salt and associated environmental concerns, it continues to be critical that the Department look for better ways to provide winter maintenance services. Pre-wetting is primarily undertaken to minimize “bounce and scatter” of granular material and begin the melting process. With the introduction of these and possibly other liquid materials, it may also be possible to decrease our salt application rates and at the same time reduce our overall costs.

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Questions Regarding 2005-2006 Winter Liquid Usage

1) What liquid material(s) did you use this past winter?

2) Were you satisfied with the performance?

3) Can you compare the results you saw with this material to materials you've used in the past?

4) Were your application rates any different from when using Calcium Chloride?

5) Did you see different performance as the temperatures decreased?

6) Did you have any issues with the screens at the liquid pump clogging?

7) Do you feel that if you could apply more liquid material, it may work more effectively?

8) When compared to Calcium Chloride, what is your overall opinion of this product?

9) Did you have any issues with storage of this product?

10) If you mixed this product with Salt Brine, what was your mix ratio?

Appendix A

Liquid Documentation Contact List

Region # _____1_____ **Date: _____03/15/2006_____**

Name	Location	Contact Phone Number
John Maksut	Scarborough	883-5180
Ron Davenport	Bridgton	647-5113
Joseph McHatton	Fryeburg	935-2646
Phil Dunn	Poland	998-4281
Ralph Williams Jr.	Gray-Gorham	657-3285
Tim Cusick	Scarborough	885-7000
Robert Fisk	Scarborough	885-7000
Randy Geaumont	Scarborough	885-7000

Region #1 - Liquid Material Usage Documentation
Meltdown 30

Overall, those interviewed (see attached list) in Region 1 are very satisfied with the Meltdown 30 product. Interviewee's agreed that Meltdown 30 seemed to last longer than the Calcium Chloride product (LiquiDow) previously used.

Meltdown 30 appeared to stay on the road longer and wasn't "tracked off" as quickly as LiquiDow. If Meltdown 30 was applied early in the evening, near the end of a storm, the material remained on the road overnight and "reactivated" the following morning when the sun came up.

Meltdown 30 worked well at low temperatures, didn't cause the road to become "slimy" and didn't refreeze like occasionally happened with the use of LiquiDow.

Application rates were slightly higher than those used with LiquiDow. It was also noted that Meltdown 30 could potentially be more effective if more liquid material could be applied.

For the winter of 2005-2006, Meltdown 30 was used only as a pre-wetting agent. No anti-icing was attempted, but those interviewed were interested in trying to anti-ice with the product.

It was noted that filters on the liquid systems occasionally plugged. It was recommended that these filters be cleaned after each storm event.

No negative issues related to storage of the product were encountered.

As a side note, confidence in salt brine appears to be waning. This may also be an issue with the limitations of our liquid application systems.

Liquid Documentation Contact List

Region # _____2_____ **Date: _____03/22/2006_____**

Name	Location	Contact Phone Number
Patrick Cronin	Knox	568-3425
Kevin Crosby	Searsport	548-6694
Fred Morgan	Winthrop	377-8117
Elroy Russell	Edgecomb	882-5512
Steve Baker	Washington	845-2387
Colby Atwood	Belgrade	495-3511
Harry Fitzgerald	Waldoboro	832-5202
Brian Theberge	N. Augusta	287-3232
Doug Carlson	Augusta	624-8222

Region #2 - Liquid Material Usage Documentation
Melt Down 30, M1000 and GeoMelt

Melt Down 30

The majority of crews in Region 2 used the Melt Down 30 product for the winter of 2005-2006 and they were not satisfied with the results. Many of the Crew Supervisors interviewed (see attached list) indicated that they had issues with the Melt Down 30 "making ice". Shortly after applying material, the road would become iced over even when higher application rates were used. Several indicated that they stopped using the product because of the poor results.

Crew Supervisors also reported having problems with the screens clogging on the truck application pumps when using the Melt Down 30.

M1000

The Crews in Washington and Edgecomb used the M1000 product for 2005-2006 and were quite happy with their results. Both Crew Supervisors indicated that M1000 compared favorably to LiquiDow. Typical application rates were in the 8 to 10 gallons per ton range, similar to LiquiDow. The product worked well at low temperatures and seemed to react quicker than LiquiDow. Another advantage mentioned was that M1000 did not "pull the frost" like LiquiDow occasionally does.

No issues with respect to storage or clogging were reported.

GeoMelt

The Maintenance crew located in Fairfield used GeoMelt to mix with their existing salt brine during the 2005-2006 winter season. The mix ratio used was 70 percent salt brine/30 percent GeoMelt. This crew is also going to try a 60 percent salt brine/40 percent GeoMelt mixture in an effort to further decrease the working temperature of the combined products. Although it was noted that the salt brine/GeoMelt mix did not work as well as Calcium Chloride (LiquiDow), they were relatively happy with the GeoMelt product. Application rates were generally in the 8 to 10 gallons per ton rate. Granular material was believed to stick on the road better when treated with the salt brine/GeoMelt mix. The Crew supervisor reported only minimal clogging of the pump screens located on the truck. No anti-icing was completed with the salt brine/GeoMelt mixture.

The crew supervisor indicated that he believed it would be advantageous to have the capability of applying more liquid to granular material.

Liquid Documentation Contact List

Region # _____3_____ **Date: _____03/21/2006_____**

Name	Location	Contact Phone Number
Ken Jordan	Turner	225-3742
David Bradeen	Turner	225-3742
Rick Jeselskis	Dixfield Office	562-4228

Region #3 - Liquid Material Usage Documentation
Ice-B-Gone

Unfortunately, only one crew (Turner) in Region 3 used the Ice-B-Gone product for one or two storm events during the winter of 2005-2006. Melt Down 30 was originally scheduled to be used in this region, but availability issues made it necessary to purchase the Ice-B-Gone.

While having only a very limited amount of experience to draw from, the Turner crew indicated that they had to use more of the product to achieve similar results compared to when they used calcium. The Ice-B-Gone also seemed to work slower initially than calcium.

Upon delivery of the product, some liquid calcium was apparently still in the storage tank and a reaction with the two chemicals (Magnesium and Calcium) caused the distribution pump at the storage tank to plug.

Those interviewed (see attached list) felt that if they could apply a greater concentration of liquid material to their salt they would get better results, regardless of the type of liquid they applied.

Liquid Documentation Contact List

Region # _____4_____ **Date: _____04/14/2006_____**

Name	Location	Contact Phone Number
Rick Rublee	Milo	943-2533
Merrill Hallowell	Pembroke	726-5585
Don Reynolds	Baileyville	427-3561
Mark Theriault	Wesley	255-8941
Kevin Dennison	Wesley	255-8941
Earl Eberhart	Bangor	941-4515
Brent Burgess	Carmel	848-3236
Earl Sutherland	Plymouth	257-3427
Ward Bond	Pittsfield	487-5722
Greg Varnum	Sedgwick	359-2511
Chris Woodward	Orland	469-3051

Region #4 - Liquid Material Usage Documentation
Geomelt C, Geomelt and Meltdown 30

In addition to salt brine, three liquid products were used in Region 4 during the winter of 2005-2006.

Geomelt C was used at the Pembroke and Plymouth maintenance lots. Upon initial delivery in Pembroke, a problem with "foaming" was experienced and an anti-foaming additive was used to minimize the problem. Plymouth did not experience this problem when the product was delivered.

Overall, the Geomelt C product appeared to work similar to our conventional Calcium Chloride mix (LiquiDow). The most significant difference was the brown coloring of the Geomelt C. Supervisors reported an appearance similar to sand on the roadways after salt/Geomelt C applications. Each Supervisor commented that the Geomelt C appeared to "stick" to the road better than the LiquiDow product.

Typical application rates were the same as when using LiquiDow. Liquid applicators are generally set at high for all liquid applications. Supervisors felt that the potential of applying more liquid material would enhance their snow fighting capability.

The warmer than usual winter weather did not allow Supervisors an opportunity to try Geomelt C at lower temperatures.

No clogging issues were encountered with the use of Geomelt C.

GeoMelt was used in two locations in Region 4 (Bangor and Baileyville). This product was mixed with salt brine using a three gallon salt brine to one gallon Geomelt mix ratio. Supervisors that used the Geomelt /salt brine mix indicated that they were able to use the mix product at lower temperatures. One Supervisor believed the Geomelt actually dropped the working temperature by 10 to 15 degrees.

As with other liquids, the typical application rate was 10 gallons/ton. The supervisors that used this product agreed that being able to apply more liquid would be a positive.

The only clogging issue occurred at the Bangor facility when a mix ratio of one gallon of Geomelt to one gallon of salt brine was mistakenly used.

A minimal amount of information regarding MeltDown 30 was available in Region 4. Those that used the product indicated that results were similar to those achieved using calcium chloride (LiquiDow). No clogging was reported and users agreed that a higher application might work more effectively.

Liquid Documentation Contact List

Region # _____5_____ **Date: _____04/12/2006_____**

Name	Location	Contact Phone Number
Richard Rossignol	Woodland	498-2274
Galen Costigan	Presque Isle Office	764-2060
Guy Cyr	Madawaska	728-6511
Larry Jordan	Presque Isle	762-7811
Ron Sites	Ashland	435-6645
Mark Ireland	Presque Isle	764-2060
Dellas Nason	Topsfield/Springfield	796-5543
Calvin White	Sherman	365-4662

Region #5 - Liquid Material Usage Documentation
Ice-B-Gone and Ice Ban

Crew Supervisors in Region 5 are very happy with the results they are getting with the Ice-B-Gone product.

The crew that used the Ice Ban product was not as happy with their results. Ice Ban appeared to work fairly well at temperatures above 20 degrees. With colder temperatures, the snow would begin to melt and then refreeze, creating ice. They also had instances where the material would freeze on the spinner(s). It was also noted that the road would stay "wet" several days after the storm. With the ability to apply a greater amount of liquid material, the crew believed the product would work better.

The supplier of the Ice Ban product believes that an improper mixture was delivered. He agreed to supply the same amount of Ice Ban at no cost to allow Region 5 to re-evaluate his product next winter.

With respect to Ice-B-Gone, those interviewed felt that the product worked similar to calcium and didn't have some of the negative characteristics. Roadways dried faster after the storm and no "slimy" film was created. It was noted that the Ice-B-Gone did not work quite as well as calcium at low temperatures.

Ice-B-Gone also seemed to stick to the road better and kept the snow "mealy and workable". Blowing snow did not melt and refreeze in areas where drifting is a problem.

The fact that the product is brown in color is also viewed as a positive. The Region 5 Manager commented that he had received a call from a traveler thanking him for returning to the use of sand. Several others also stated that travelers had mentioned the perceived use of sand.

In one isolated area near the Presque Isle office, Ice-B-Gone was used successfully as a dust control agent.

Some minimal clogging in the storage tanks was mentioned and Managers are now recommending that stored product be circulated monthly.

Region 5 has also removed the filtering screens located near the individual truck pumps and have not had any negative consequences.

Ice-B-Gone was not used as an anti-icing agent during the winter of 2005-2006

All of those interviewed agreed that being able to apply more liquid material would be a positive.

Appendix B

Granular/Liquid Cost Summary

Granular and Liquid Cost/Mile Using a 300 Pound/Mile Application Rate

Liquid Rate	Salt Brine	Salt Brine/ GeoMelt	MeltDown 30	M1000	IceBan	Ice-B-Gone	GeoMelt C
70% Granular/30% Liquid (Schmidt Spreader)	$6.48	$11.71	$12.04	$12.78	$14.66	$15.03	$16.38
6 Gallons per Ton (Low Setting)	$7.64	$8.21	$8.25	$8.33	$8.54	$8.58	$8.72
8 Gallons per Ton (Medium Setting)	$7.68	$8.45	$8.50	$8.60	$8.88	$8.93	$9.13
10 Gallons per Ton (High Setting)	$7.73	$8.69	$8.75	$8.88	$9.23	$9.29	$9.54

Granular and Liquid Cost/Mile Using a 350 Pound/Mile Application Rate

Liquid Rate	Salt Brine	Salt Brine/ GeoMelt	MeltDown 30	M1000	IceBan	Ice-B-Gone	GeoMelt C
70% Granular/30% Liquid (Schmidt Spreader)	$7.56	$13.67	$14.05	$14.91	$17.10	$17.53	$19.11
6 Gallons per Ton (Low Setting)	$8.91	$9.58	$9.62	$9.72	$9.96	$10.00	$10.18
8 Gallons per Ton (Medium Setting)	$8.96	$9.86	$9.91	$10.04	$10.36	$10.42	$10.65
10 Gallons per Ton (High Setting)	$9.01	$10.13	$10.20	$10.36	$10.76	$10.84	$11.13

Granular and Liquid Cost/Mile Using a 400 Pound/Mile Application Rate

Liquid Rate	Salt Brine	Salt Brine/ GeoMelt	MeltDown 30	M1000	IceBan	Ice-B-Gone	GeoMelt C
70% Granular/30% Liquid (Schmidt Spreader)	$8.64	$15.62	$16.05	$17.04	$19.55	$20.04	$21.84
6 Gallons per Ton (Low Setting)	$10.18	$10.95	$11.00	$11.10	$11.38	$11.43	$11.63
8 Gallons per Ton (Medium Setting)	$10.24	$11.26	$11.33	$11.47	$11.84	$11.91	$12.18
10 Gallons per Ton (High Setting)	$10.30	$11.58	$11.66	$11.84	$12.30	$12.39	$12.72

Salt/Liquid Applications - Salt Brine

Enter Salt Cost per Ton	SALT/TON	Enter Liquid Cost per Gallon	LIQUID/GALLON
	$50.00		$0.15

70% granular 30% liquid application

Application Rate/Mile	Amount of Granular Salt(lbs.)	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	140	$3.50	5.45	$0.82	**$4.32**	$5.00	-$0.68
250	175	$4.38	6.82	$1.02	**$5.40**	$6.25	-$0.85
300	210	$5.25	8.18	$1.23	**$6.48**	$7.50	-$1.02
350	245	$6.13	9.55	$1.43	**$7.56**	$8.75	-$1.19
400	280	$7.00	10.91	$1.64	**$8.64**	$10.00	-$1.36
450	315	$7.88	12.27	$1.84	**$9.72**	$11.25	-$1.53
500	350	$8.75	13.64	$2.05	**$10.80**	$12.50	-$1.70
550	385	$9.63	15.00	$2.25	**$11.88**	$13.75	-$1.88
600	420	$10.50	16.36	$2.45	**$12.95**	$15.00	-$2.05

6 Gallons/Ton

Application Rate/Mile	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	$5.00	0.60	$0.09	**$5.09**	$5.00	$0.09
250	$6.25	0.75	$0.11	**$6.36**	$6.25	$0.11
300	$7.50	0.90	$0.14	**$7.64**	$7.50	$0.14
350	$8.75	1.05	$0.16	**$8.91**	$8.75	$0.16
400	$10.00	1.20	$0.18	**$10.18**	$10.00	$0.18
450	$11.25	1.35	$0.20	**$11.45**	$11.25	$0.20
500	$12.50	1.50	$0.23	**$12.73**	$12.50	$0.23
550	$13.75	1.65	$0.25	**$14.00**	$13.75	$0.25
600	$15.00	1.80	$0.27	**$15.27**	$15.00	$0.27

Salt/Liquid Applications - Salt Brine (Cont.)

8 Gallons/Ton

Application Rate/Mile	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	$5.00	0.80	$0.12	**$5.12**	$5.00	$0.12
250	$6.25	1.00	$0.15	**$6.40**	$6.25	$0.15
300	$7.50	1.20	$0.18	**$7.68**	$7.50	$0.18
350	$8.75	1.40	$0.21	**$8.96**	$8.75	$0.21
400	$10.00	1.60	$0.24	**$10.24**	$10.00	$0.24
450	$11.25	1.80	$0.27	**$11.52**	$11.25	$0.27
500	$12.50	2.00	$0.30	**$12.80**	$12.50	$0.30
550	$13.75	2.20	$0.33	**$14.08**	$13.75	$0.33
600	$15.00	2.40	$0.36	**$15.36**	$15.00	$0.36

10 Gallons/Ton

Application Rate/Mile	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	$5.00	1.00	$0.15	**$5.15**	$5.00	$0.15
250	$6.25	1.25	$0.19	**$6.44**	$6.25	$0.19
300	$7.50	1.50	$0.23	**$7.73**	$7.50	$0.23
350	$8.75	1.75	$0.26	**$9.01**	$8.75	$0.26
400	$10.00	2.00	$0.30	**$10.30**	$10.00	$0.30
450	$11.25	2.25	$0.34	**$11.59**	$11.25	$0.34
500	$12.50	2.50	$0.38	**$12.88**	$12.50	$0.38
550	$13.75	2.75	$0.41	**$14.16**	$13.75	$0.41
600	$15.00	3.00	$0.45	**$15.45**	$15.00	$0.45

Salt/Liquid Applications - Salt Brine/Geomelt

Enter Salt Cost per Ton	SALT/TON	Enter Liquid Cost per Gallon	LIQUID/GALLON
	$50.00		$0.79

70% granular 30% liquid application

Application Rate/Mile	Amount of Granular Salt(lbs.)	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	140	$3.50	5.45	$4.31	**$7.81**	$5.00	$2.81
250	175	$4.38	6.82	$5.39	**$9.76**	$6.25	$3.51
300	210	$5.25	8.18	$6.46	**$11.71**	$7.50	$4.21
350	245	$6.13	9.55	$7.54	**$13.67**	$8.75	$4.92
400	280	$7.00	10.91	$8.62	**$15.62**	$10.00	$5.62
450	315	$7.88	12.27	$9.70	**$17.57**	$11.25	$6.32
500	350	$8.75	13.64	$10.77	**$19.52**	$12.50	$7.02
550	385	$9.63	15.00	$11.85	**$21.48**	$13.75	$7.73
600	420	$10.50	16.36	$12.93	**$23.43**	$15.00	$8.43

6 Gallons/Ton

Application Rate/Mile	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	$5.00	0.60	$0.47	**$5.47**	$5.00	$0.47
250	$6.25	0.75	$0.59	**$6.84**	$6.25	$0.59
300	$7.50	0.90	$0.71	**$8.21**	$7.50	$0.71
350	$8.75	1.05	$0.83	**$9.58**	$8.75	$0.83
400	$10.00	1.20	$0.95	**$10.95**	$10.00	$0.95
450	$11.25	1.35	$1.07	**$12.32**	$11.25	$1.07
500	$12.50	1.50	$1.19	**$13.69**	$12.50	$1.19
550	$13.75	1.65	$1.30	**$15.05**	$13.75	$1.30
600	$15.00	1.80	$1.42	**$16.42**	$15.00	$1.42

Salt/Liquid Applications - Salt Brine/Geomelt (Cont.)

8 Gallons/Ton

Application Rate/Mile	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	$5.00	0.80	$0.63	**$5.63**	$5.00	$0.63
250	$6.25	1.00	$0.79	**$7.04**	$6.25	$0.79
300	$7.50	1.20	$0.95	**$8.45**	$7.50	$0.95
350	$8.75	1.40	$1.11	**$9.86**	$8.75	$1.11
400	$10.00	1.60	$1.26	**$11.26**	$10.00	$1.26
450	$11.25	1.80	$1.42	**$12.67**	$11.25	$1.42
500	$12.50	2.00	$1.58	**$14.08**	$12.50	$1.58
550	$13.75	2.20	$1.74	**$15.49**	$13.75	$1.74
600	$15.00	2.40	$1.90	**$16.90**	$15.00	$1.90

10 Gallons/Ton

Application Rate/Mile	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	$5.00	1.00	$0.79	**$5.79**	$5.00	$0.79
250	$6.25	1.25	$0.99	**$7.24**	$6.25	$0.99
300	$7.50	1.50	$1.19	**$8.69**	$7.50	$1.19
350	$8.75	1.75	$1.38	**$10.13**	$8.75	$1.38
400	$10.00	2.00	$1.58	**$11.58**	$10.00	$1.58
450	$11.25	2.25	$1.78	**$13.03**	$11.25	$1.78
500	$12.50	2.50	$1.98	**$14.48**	$12.50	$1.98
550	$13.75	2.75	$2.17	**$15.92**	$13.75	$2.17
600	$15.00	3.00	$2.37	**$17.37**	$15.00	$2.37

Salt/Liquid Applications - MeltDown 30

Enter Salt Cost per Ton	SALT/TON	Enter Liquid Cost per Gallon	LIQUID/GALLON
	$50.00		$0.83

70% granular 30% liquid application

Application Rate/Mile	Amount of Granular Salt(lbs.)	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	140	$3.50	5.45	$4.53	**$8.03**	$5.00	$3.03
250	175	$4.38	6.82	$5.66	**$10.03**	$6.25	$3.78
300	210	$5.25	8.18	$6.79	**$12.04**	$7.50	$4.54
350	245	$6.13	9.55	$7.92	**$14.05**	$8.75	$5.30
400	280	$7.00	10.91	$9.05	**$16.05**	$10.00	$6.05
450	315	$7.88	12.27	$10.19	**$18.06**	$11.25	$6.81
500	350	$8.75	13.64	$11.32	**$20.07**	$12.50	$7.57
550	385	$9.63	15.00	$12.45	**$22.08**	$13.75	$8.33
600	420	$10.50	16.36	$13.58	**$24.08**	$15.00	$9.08

6 Gallons/Ton

Application Rate/Mile	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	$5.00	0.60	$0.50	**$5.50**	$5.00	$0.50
250	$6.25	0.75	$0.62	**$6.87**	$6.25	$0.62
300	$7.50	0.90	$0.75	**$8.25**	$7.50	$0.75
350	$8.75	1.05	$0.87	**$9.62**	$8.75	$0.87
400	$10.00	1.20	$1.00	**$11.00**	$10.00	$1.00
450	$11.25	1.35	$1.12	**$12.37**	$11.25	$1.12
500	$12.50	1.50	$1.25	**$13.75**	$12.50	$1.25
550	$13.75	1.65	$1.37	**$15.12**	$13.75	$1.37
600	$15.00	1.80	$1.49	**$16.49**	$15.00	$1.49

Salt/Liquid Applications - MeltDown 30 (Cont.)

8 Gallons/Ton

Application Rate/Mile	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	$5.00	0.80	$0.66	**$5.66**	$5.00	$0.66
250	$6.25	1.00	$0.83	**$7.08**	$6.25	$0.83
300	$7.50	1.20	$1.00	**$8.50**	$7.50	$1.00
350	$8.75	1.40	$1.16	**$9.91**	$8.75	$1.16
400	$10.00	1.60	$1.33	**$11.33**	$10.00	$1.33
450	$11.25	1.80	$1.49	**$12.74**	$11.25	$1.49
500	$12.50	2.00	$1.66	**$14.16**	$12.50	$1.66
550	$13.75	2.20	$1.83	**$15.58**	$13.75	$1.83
600	$15.00	2.40	$1.99	**$16.99**	$15.00	$1.99

10 Gallons/Ton

Application Rate/Mile	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	$5.00	1.00	$0.83	**$5.83**	$5.00	$0.83
250	$6.25	1.25	$1.04	**$7.29**	$6.25	$1.04
300	$7.50	1.50	$1.25	**$8.75**	$7.50	$1.25
350	$8.75	1.75	$1.45	**$10.20**	$8.75	$1.45
400	$10.00	2.00	$1.66	**$11.66**	$10.00	$1.66
450	$11.25	2.25	$1.87	**$13.12**	$11.25	$1.87
500	$12.50	2.50	$2.08	**$14.58**	$12.50	$2.08
550	$13.75	2.75	$2.28	**$16.03**	$13.75	$2.28
600	$15.00	3.00	$2.49	**$17.49**	$15.00	$2.49

Salt/Liquid Applications - M1000

Enter Salt Cost per Ton	SALT/TON	Enter Liquid Cost per Gallon	LIQUID/GALLON
	$50.00		$0.92

70% granular 30% liquid application

Application Rate/Mile	Amount of Granular Salt(lbs.)	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	140	$3.50	5.45	$5.02	**$8.52**	$5.00	$3.52
250	175	$4.38	6.82	$6.27	**$10.65**	$6.25	$4.40
300	210	$5.25	8.18	$7.53	**$12.78**	$7.50	$5.28
350	245	$6.13	9.55	$8.78	**$14.91**	$8.75	$6.16
400	280	$7.00	10.91	$10.04	**$17.04**	$10.00	$7.04
450	315	$7.88	12.27	$11.29	**$19.17**	$11.25	$7.92
500	350	$8.75	13.64	$12.55	**$21.30**	$12.50	$8.80
550	385	$9.63	15.00	$13.80	**$23.43**	$13.75	$9.68
600	420	$10.50	16.36	$15.05	**$25.55**	$15.00	$10.55

6 Gallons/Ton

Application Rate/Mile	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	$5.00	0.60	$0.55	**$5.55**	$5.00	$0.55
250	$6.25	0.75	$0.69	**$6.94**	$6.25	$0.69
300	$7.50	0.90	$0.83	**$8.33**	$7.50	$0.83
350	$8.75	1.05	$0.97	**$9.72**	$8.75	$0.97
400	$10.00	1.20	$1.10	**$11.10**	$10.00	$1.10
450	$11.25	1.35	$1.24	**$12.49**	$11.25	$1.24
500	$12.50	1.50	$1.38	**$13.88**	$12.50	$1.38
550	$13.75	1.65	$1.52	**$15.27**	$13.75	$1.52
600	$15.00	1.80	$1.66	**$16.66**	$15.00	$1.66

Salt/Liquid Applications - M1000 (Cont.)

8 Gallons/Ton

Application Rate/Mile	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	$5.00	0.80	$0.74	**$5.74**	$5.00	$0.74
250	$6.25	1.00	$0.92	**$7.17**	$6.25	$0.92
300	$7.50	1.20	$1.10	**$8.60**	$7.50	$1.10
350	$8.75	1.40	$1.29	**$10.04**	$8.75	$1.29
400	$10.00	1.60	$1.47	**$11.47**	$10.00	$1.47
450	$11.25	1.80	$1.66	**$12.91**	$11.25	$1.66
500	$12.50	2.00	$1.84	**$14.34**	$12.50	$1.84
550	$13.75	2.20	$2.02	**$15.77**	$13.75	$2.02
600	$15.00	2.40	$2.21	**$17.21**	$15.00	$2.21

10 Gallons/Ton

Application Rate/Mile	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	$5.00	1.00	$0.92	**$5.92**	$5.00	$0.92
250	$6.25	1.25	$1.15	**$7.40**	$6.25	$1.15
300	$7.50	1.50	$1.38	**$8.88**	$7.50	$1.38
350	$8.75	1.75	$1.61	**$10.36**	$8.75	$1.61
400	$10.00	2.00	$1.84	**$11.84**	$10.00	$1.84
450	$11.25	2.25	$2.07	**$13.32**	$11.25	$2.07
500	$12.50	2.50	$2.30	**$14.80**	$12.50	$2.30
550	$13.75	2.75	$2.53	**$16.28**	$13.75	$2.53
600	$15.00	3.00	$2.76	**$17.76**	$15.00	$2.76

Salt/Liquid Applications - IceBan

Enter Salt Cost per Ton	SALT/TON	Enter Liquid Cost per Gallon	LIQUID/GALLON
	$50.00		$1.15

70% granular 30% liquid application

Application Rate/Mile	Amount of Granular Salt(lbs.)	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	140	$3.50	5.45	$6.27	**$9.77**	$5.00	$4.77
250	175	$4.38	6.82	$7.84	**$12.22**	$6.25	$5.97
300	210	$5.25	8.18	$9.41	**$14.66**	$7.50	$7.16
350	245	$6.13	9.55	$10.98	**$17.10**	$8.75	$8.35
400	280	$7.00	10.91	$12.55	**$19.55**	$10.00	$9.55
450	315	$7.88	12.27	$14.11	**$21.99**	$11.25	$10.74
500	350	$8.75	13.64	$15.68	**$24.43**	$12.50	$11.93
550	385	$9.63	15.00	$17.25	**$26.88**	$13.75	$13.13
600	420	$10.50	16.36	$18.82	**$29.32**	$15.00	$14.32

6 Gallons/Ton

Application Rate/Mile	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	$5.00	0.60	$0.69	**$5.69**	$5.00	$0.69
250	$6.25	0.75	$0.86	**$7.11**	$6.25	$0.86
300	$7.50	0.90	$1.04	**$8.54**	$7.50	$1.04
350	$8.75	1.05	$1.21	**$9.96**	$8.75	$1.21
400	$10.00	1.20	$1.38	**$11.38**	$10.00	$1.38
450	$11.25	1.35	$1.55	**$12.80**	$11.25	$1.55
500	$12.50	1.50	$1.73	**$14.23**	$12.50	$1.73
550	$13.75	1.65	$1.90	**$15.65**	$13.75	$1.90
600	$15.00	1.80	$2.07	**$17.07**	$15.00	$2.07

Salt/Liquid Applications - IceBan (Cont.)

8 Gallons/Ton

Application Rate/Mile	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	$5.00	0.80	$0.92	**$5.92**	$5.00	$0.92
250	$6.25	1.00	$1.15	**$7.40**	$6.25	$1.15
300	$7.50	1.20	$1.38	**$8.88**	$7.50	$1.38
350	$8.75	1.40	$1.61	**$10.36**	$8.75	$1.61
400	$10.00	1.60	$1.84	**$11.84**	$10.00	$1.84
450	$11.25	1.80	$2.07	**$13.32**	$11.25	$2.07
500	$12.50	2.00	$2.30	**$14.80**	$12.50	$2.30
550	$13.75	2.20	$2.53	**$16.28**	$13.75	$2.53
600	$15.00	2.40	$2.76	**$17.76**	$15.00	$2.76

10 Gallons/Ton

Application Rate/Mile	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	$5.00	1.00	$1.15	**$6.15**	$5.00	$1.15
250	$6.25	1.25	$1.44	**$7.69**	$6.25	$1.44
300	$7.50	1.50	$1.73	**$9.23**	$7.50	$1.73
350	$8.75	1.75	$2.01	**$10.76**	$8.75	$2.01
400	$10.00	2.00	$2.30	**$12.30**	$10.00	$2.30
450	$11.25	2.25	$2.59	**$13.84**	$11.25	$2.59
500	$12.50	2.50	$2.88	**$15.38**	$12.50	$2.88
550	$13.75	2.75	$3.16	**$16.91**	$13.75	$3.16
600	$15.00	3.00	$3.45	**$18.45**	$15.00	$3.45

Salt/Liquid Applications - Ice-B-Gone

Enter Salt Cost per Ton	SALT/TON	Enter Liquid Cost per Gallon	LIQUID/GALLON
	$50.00		$1.20

70% granular 30% liquid application

Application Rate/Mile	Amount of Granular Salt(lbs.)	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	140	$3.50	5.45	$6.52	**$10.02**	$5.00	$5.02
250	175	$4.38	6.82	$8.15	**$12.52**	$6.25	$6.27
300	210	$5.25	8.18	$9.78	**$15.03**	$7.50	$7.53
350	245	$6.13	9.55	$11.41	**$17.53**	$8.75	$8.78
400	280	$7.00	10.91	$13.04	**$20.04**	$10.00	$10.04
450	315	$7.88	12.27	$14.67	**$22.54**	$11.25	$11.29
500	350	$8.75	13.64	$16.30	**$25.05**	$12.50	$12.55
550	385	$9.63	15.00	$17.93	**$27.55**	$13.75	$13.80
600	420	$10.50	16.36	$19.55	**$30.05**	$15.00	$15.05

6 Gallons/Ton

Application Rate/Mile	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	$5.00	0.60	$0.72	**$5.72**	$5.00	$0.72
250	$6.25	0.75	$0.90	**$7.15**	$6.25	$0.90
300	$7.50	0.90	$1.08	**$8.58**	$7.50	$1.08
350	$8.75	1.05	$1.25	**$10.00**	$8.75	$1.25
400	$10.00	1.20	$1.43	**$11.43**	$10.00	$1.43
450	$11.25	1.35	$1.61	**$12.86**	$11.25	$1.61
500	$12.50	1.50	$1.79	**$14.29**	$12.50	$1.79
550	$13.75	1.65	$1.97	**$15.72**	$13.75	$1.97
600	$15.00	1.80	$2.15	**$17.15**	$15.00	$2.15

Salt/Liquid Applications - Ice-B-Gone (Cont.)

8 Gallons/Ton

Application Rate/Mile	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	$5.00	0.80	$0.96	**$5.96**	$5.00	$0.96
250	$6.25	1.00	$1.20	**$7.45**	$6.25	$1.20
300	$7.50	1.20	$1.43	**$8.93**	$7.50	$1.43
350	$8.75	1.40	$1.67	**$10.42**	$8.75	$1.67
400	$10.00	1.60	$1.91	**$11.91**	$10.00	$1.91
450	$11.25	1.80	$2.15	**$13.40**	$11.25	$2.15
500	$12.50	2.00	$2.39	**$14.89**	$12.50	$2.39
550	$13.75	2.20	$2.63	**$16.38**	$13.75	$2.63
600	$15.00	2.40	$2.87	**$17.87**	$15.00	$2.87

10 Gallons/Ton

Application Rate/Mile	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	$5.00	1.00	$1.20	**$6.20**	$5.00	$1.20
250	$6.25	1.25	$1.49	**$7.74**	$6.25	$1.49
300	$7.50	1.50	$1.79	**$9.29**	$7.50	$1.79
350	$8.75	1.75	$2.09	**$10.84**	$8.75	$2.09
400	$10.00	2.00	$2.39	**$12.39**	$10.00	$2.39
450	$11.25	2.25	$2.69	**$13.94**	$11.25	$2.69
500	$12.50	2.50	$2.99	**$15.49**	$12.50	$2.99
550	$13.75	2.75	$3.29	**$17.04**	$13.75	$3.29
600	$15.00	3.00	$3.59	**$18.59**	$15.00	$3.59

Salt/Liquid Applications - GeoMelt C

Enter Salt Cost per Ton	SALT/TON	Enter Liquid Cost per Gallon	LIQUID/GALLON
	$50.00		$1.36

70% granular 30% liquid application

Application Rate/Mile	Amount of Granular Salt(lbs.)	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	140	$3.50	5.45	$7.42	**$10.92**	$5.00	$5.92
250	175	$4.38	6.82	$9.27	**$13.65**	$6.25	$7.40
300	210	$5.25	8.18	$11.13	**$16.38**	$7.50	$8.88
350	245	$6.13	9.55	$12.98	**$19.11**	$8.75	$10.36
400	280	$7.00	10.91	$14.84	**$21.84**	$10.00	$11.84
450	315	$7.88	12.27	$16.69	**$24.57**	$11.25	$13.32
500	350	$8.75	13.64	$18.55	**$27.30**	$12.50	$14.80
550	385	$9.63	15.00	$20.40	**$30.03**	$13.75	$16.28
600	420	$10.50	16.36	$22.25	**$32.75**	$15.00	$17.75

6 Gallons/Ton

Application Rate/Mile	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	$5.00	0.60	$0.82	**$5.82**	$5.00	$0.82
250	$6.25	0.75	$1.02	**$7.27**	$6.25	$1.02
300	$7.50	0.90	$1.22	**$8.72**	$7.50	$1.22
350	$8.75	1.05	$1.43	**$10.18**	$8.75	$1.43
400	$10.00	1.20	$1.63	**$11.63**	$10.00	$1.63
450	$11.25	1.35	$1.84	**$13.09**	$11.25	$1.84
500	$12.50	1.50	$2.04	**$14.54**	$12.50	$2.04
550	$13.75	1.65	$2.24	**$15.99**	$13.75	$2.24
600	$15.00	1.80	$2.45	**$17.45**	$15.00	$2.45

Salt/Liquid Applications - GeoMelt C (Cont.)

8 Gallons/Ton

Application Rate/Mile	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	$5.00	0.80	$1.09	**$6.09**	$5.00	$1.09
250	$6.25	1.00	$1.36	**$7.61**	$6.25	$1.36
300	$7.50	1.20	$1.63	**$9.13**	$7.50	$1.63
350	$8.75	1.40	$1.90	**$10.65**	$8.75	$1.90
400	$10.00	1.60	$2.18	**$12.18**	$10.00	$2.18
450	$11.25	1.80	$2.45	**$13.70**	$11.25	$2.45
500	$12.50	2.00	$2.72	**$15.22**	$12.50	$2.72
550	$13.75	2.20	$2.99	**$16.74**	$13.75	$2.99
600	$15.00	2.40	$3.26	**$18.26**	$15.00	$3.26

10 Gallons/Ton

Application Rate/Mile	Cost of Granular	Amount of Liquid (gallons)	Cost of Liquid	Per mile Application cost Granular-Liquid Mix	Granular salt only (w/o liquid)	Difference
200	$5.00	1.00	$1.36	**$6.36**	$5.00	$1.36
250	$6.25	1.25	$1.70	**$7.95**	$6.25	$1.70
300	$7.50	1.50	$2.04	**$9.54**	$7.50	$2.04
350	$8.75	1.75	$2.38	**$11.13**	$8.75	$2.38
400	$10.00	2.00	$2.72	**$12.72**	$10.00	$2.72
450	$11.25	2.25	$3.06	**$14.31**	$11.25	$3.06
500	$12.50	2.50	$3.40	**$15.90**	$12.50	$3.40
550	$13.75	2.75	$3.74	**$17.49**	$13.75	$3.74
600	$15.00	3.00	$4.08	**$19.08**	$15.00	$4.08